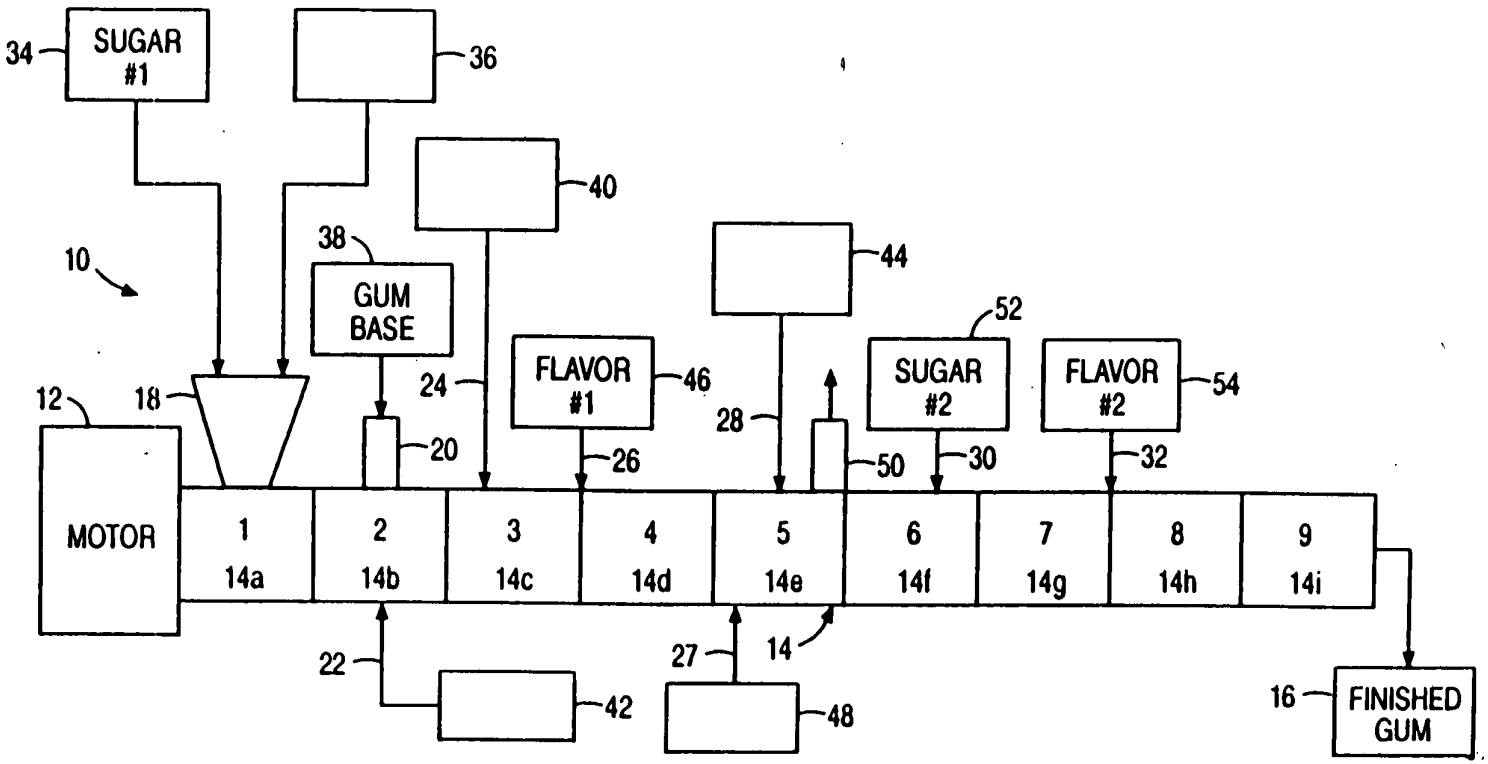
34
SUGAR #1
36
40
38
GUM BASE
10
44
52
12
18
24
FLAVOR #1
46
28
SUGAR #2
FLAVOR #2
54
20
26
50
30
32
MOTOR
1 14a
2 14b
3 14c
4 14d
5 14e
6 14f
7 14g
8 14h
9 14i
22
27
14
42
48
16
FINISHED GUM

FIG. 1

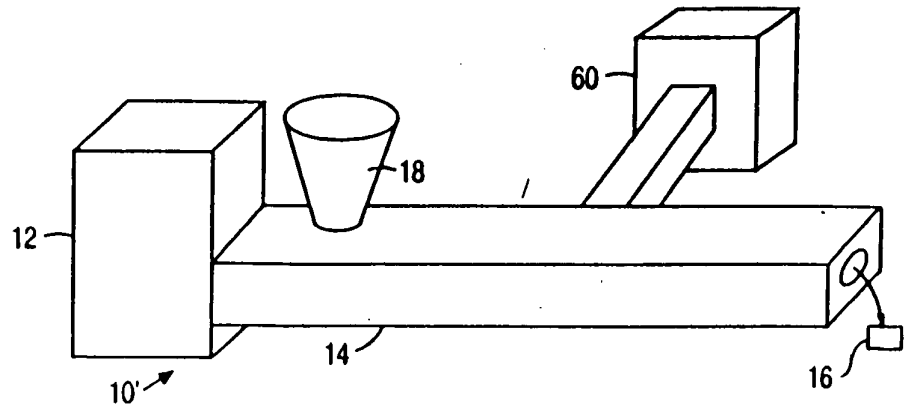
60
18
12
14
16
10'

FIG. 2

Sample	RPM	Sugar Split	Flavor Location	Flavor %	Multivariate Distance From Average Control
1	55	80:20	4	80	6.608
2	70	80:20	4	90	6.351
3	55	100:0	4	90	6.543
4	70	100:0	4	80	5.439
5	55	80:20	7/8	90	5.808
6	70	80:20	7/8	80	10.445
7	55	100:0	7/8	80	5.766
8	70	100:0	7/8	90	6.117
9	60	100:0	4	85	8.251
10	60	80:20	7/8	85	9.386

80

FIG. 3

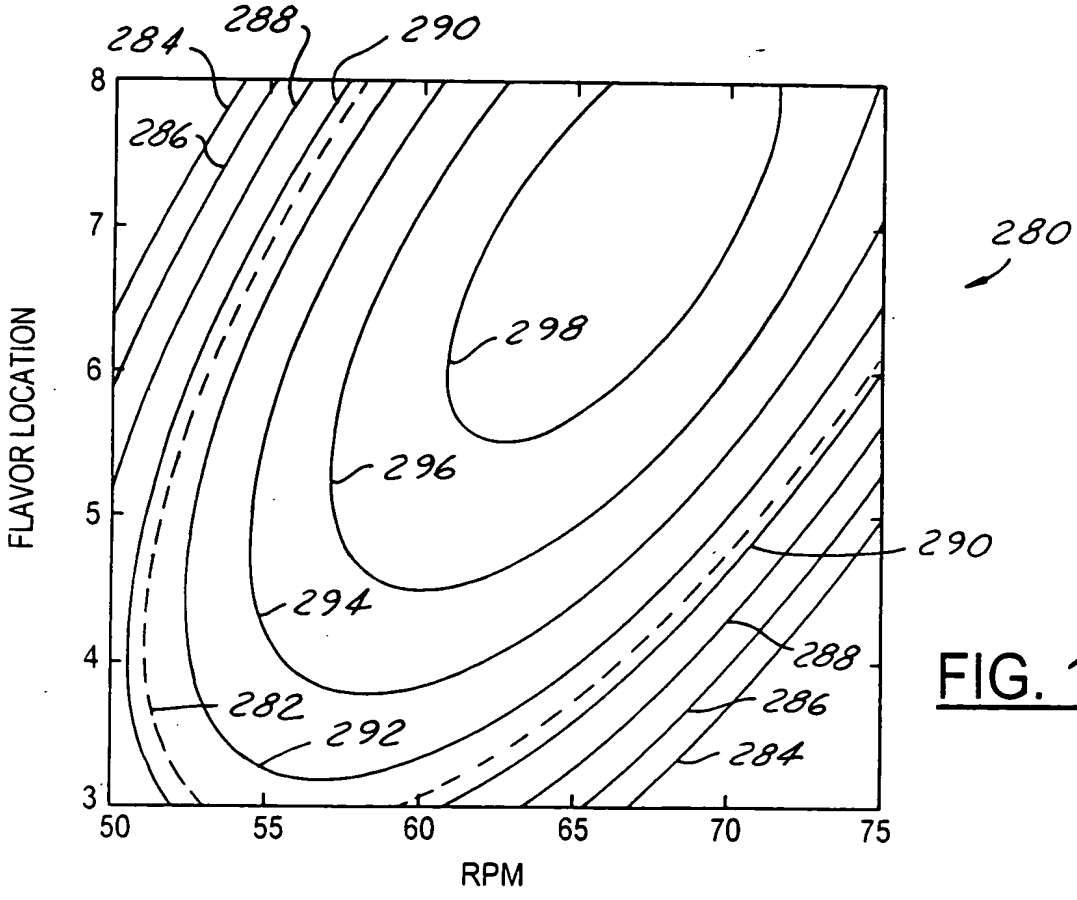

FIG. 16

	Sample										
Attribute	1	2	3	4	5	6	7	8	9	10	Control
Initial											
Hardness	⇓	⇓	⇓	–	↓	↓	–	–	–	–	60.4
30 Seconds											
Fruit Flavor	↑	–	↑	–	–	–	⇑	⇑	–	–	66.5
Strawberry Jam	–	–	↑	–	–	–	⇑	⇑	–	–	37.4
Sweetness	⇑	–	⇑	–	–	–	–	↑	↑	↑	58.9
Sourness	–	–	–	–	–	⇓	–	–	–	⇓	33.1
1 Minute											
Fruit Flavor	–	–	–	–	–	↓	–	↑	–	–	66.1
Strawberry Jam	–	–	↑	–	–	–	↑	–	–	–	38.6
Sweetness	–	–	–	–	–	–	–	↑	–	–	63.4
Sourness	–	⇓	–	–	–	⇓	–	–	–	⇓	37.6
Hardness	–	–	–	⇑	⇓	–	–	–	–	–	50.6
Toughness	–	–	–	⇑	–	⇓	–	–	–	–	63.3
Graininess	–	–	–	–	–	–	–	–	–	↑	38.3
Ease Of Bubble Blowing	–	–	–	–	–	⇓	–	↓	–	–	73.2
2.5 Minutes											
Fruit Flavor	–	–	–	–	–	⇓	–	–	–	–	61.6
Strawberry Jam	–	–	–	–	–	–	–	–	–	–	32.1
Sweetness	–	–	–	–	–	⇓	–	–	–	–	57.8
Sourness	–	↓	⇓	–	–	⇑	⇓	–	⇓	–	29.3
Hardness	–	–	–	–	–	–	–	–	–	–	55.0
Toughness	–	–	–	↑	–	⇓	–	–	–	–	72.6
Graininess	–	–	–	–	–	–	–	–	–	–	27.8
Ease Of Bubble Blowing	–	–	–	–	–	–	–	–	–	–	82.6

85A

FIG. 4A

	Sample										
Attribute	1	2	3	4	5	6	7	8	9	10	Control
5 Minutes											
Fruit Flavor	–	–	–	–	–	–	–	–	–	–	48.8
Strawberry Jam	–	–	–	–	–	–	–	–	–	–	18.1
Sweetness	–	–	↓	–	–	–	–	–	–	–	47.1
Sourness	–	–	–	–	–	–	⇓	–	–	–	17.3
Hardness	–	–	–	–	–	–	⇓	–	–	–	58.2
Toughness	–	–	–	⇑	–	–	–	–	–	–	78.4
Graininess	⇓	–	–	⇓	–	–	–	–	–	↓	19.2
Ease Of Bubble Blowing	–	–	–	–	–	–	–	–	–	–	89.6
7 Minutes											
Fruit Flavor	–	–	–	–	–	–	–	–	–	–	41.1
Strawberry Jam	–	–	–	–	–	–	–	–	–	–	13.2
Sweetnes	–	–	–	–	–	–	–	–	–	–	35.2
Sourness	–	–	–	–	–	⇓	–	–	–	⇓	15.1
Hardness	–	–	–	–	↓	⇓	–	–	–	–	58.8
Toughness	–	–	↑	–	–	–	–	–	–	↓	81.2
Graininess	⇓	–	↓	–	–	⇓	–	↓	⇓	⇓	15.5
Ease Of Bubble Blowing	–	–	–	–	–	–	–	–	–	–	91.7
10 Minutes											
Fruit Flavor	–	–	–	–	–	–	–	–	–	–	32.5
Strawberry	–	↓	–	–	–	–	–	–	–	–	8.3
Sweetness	–	–	–	–	–	–	–	–	–	–	22.3
Sourness	–	–	–	–	–	–	–	–	–	–	9.1
Hardness	–	–	–	–	–	–	–	–	–	–	58.9
Toughness	–	–	–	↑	–	–	–	–	–	–	83.2
Graininess	⇓	–	–	⇓	⇓	⇓	–	–	⇓	–	12.5
Ease Of Bubble Blowing	–	–	–	–	–	–	–	–	–	–	91.2

85B

FIG. 4B

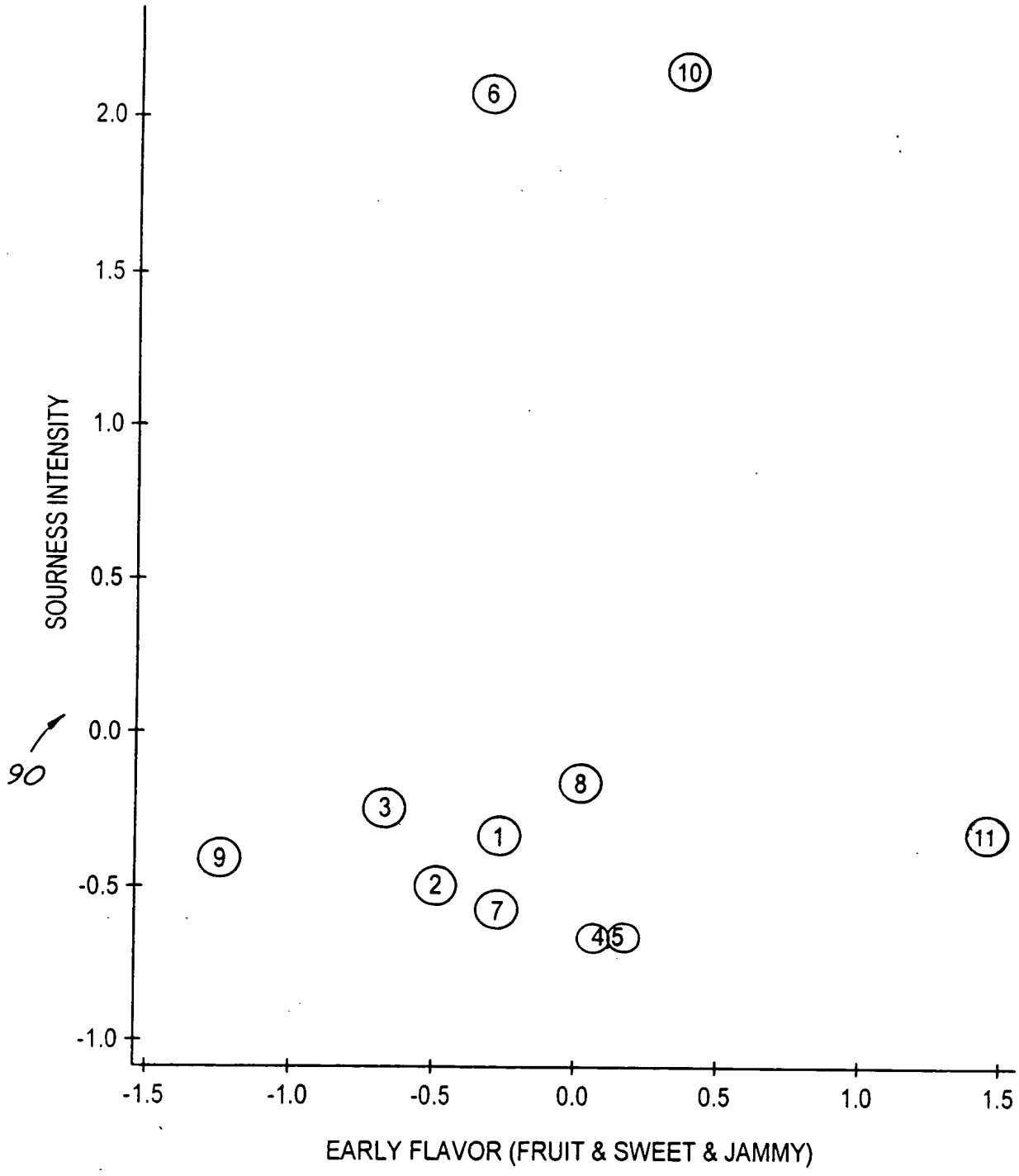
SOURNESS INTENSITY
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
EARLY FLAVOR (FRUIT & SWEET & JAMMY)
90
6
10
8
3
1
11
9
2
7
4
5

FIG. 5

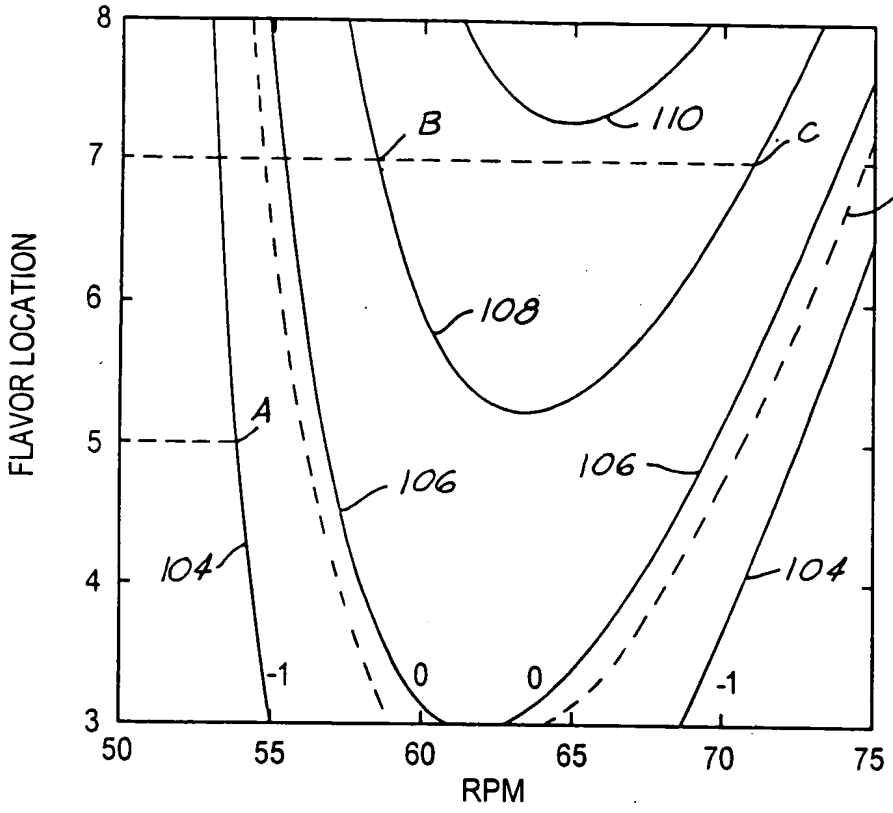
FLAVOR LOCATION
RPM
8
7
6
5
4
3
50
55
60
65
70
75
A
B
C
102
104
106
108
110
-1
0
0
-1
100

FIG. 6

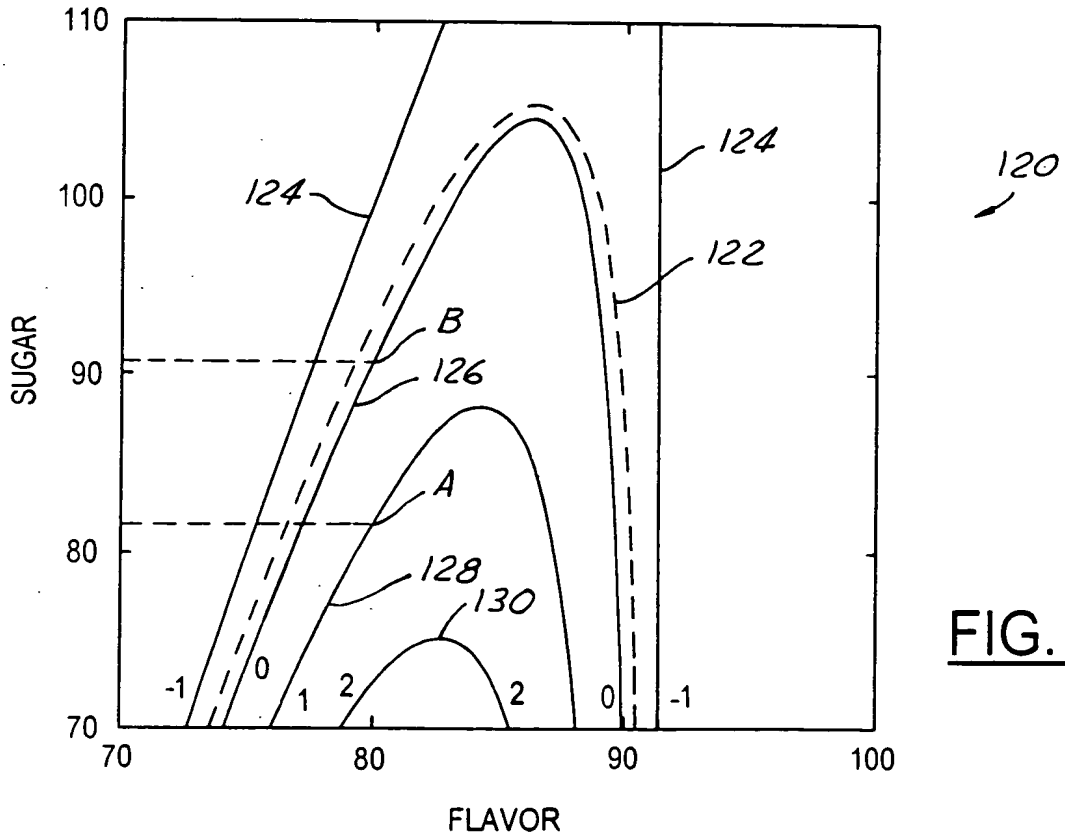
SUGAR
FLAVOR
110
100
90
80
70
70
80
90
100
120
122
124
126
128
130
A
B
-1
0
1
2
2
0
-1

FIG. 7

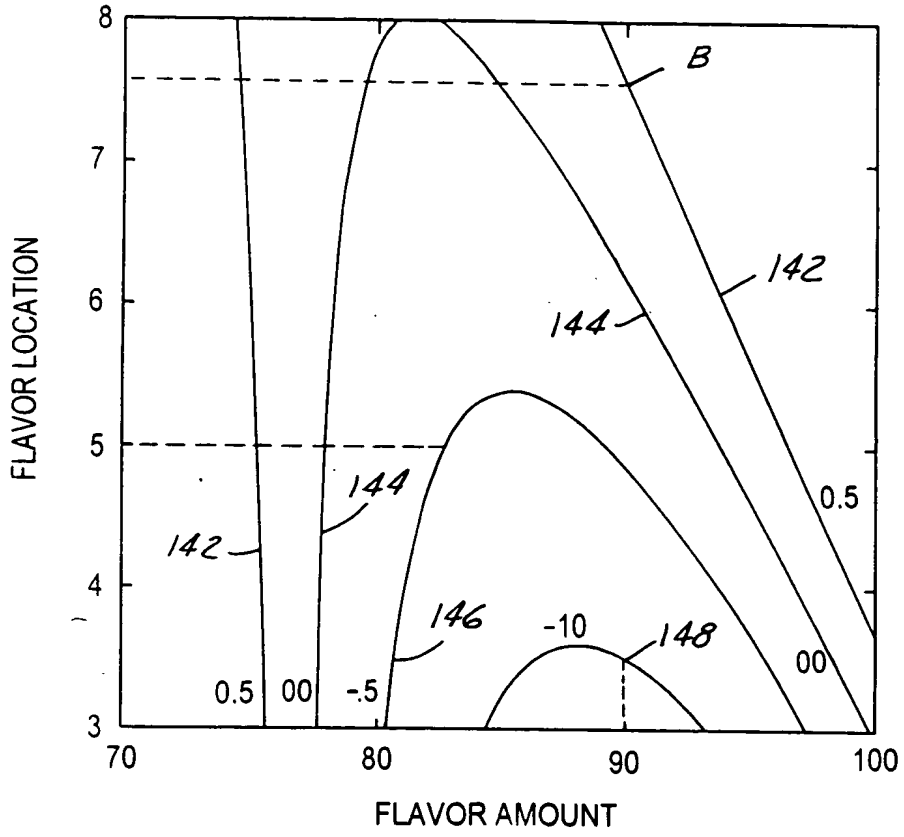
8
7
6
5
4
3
FLAVOR LOCATION
70
80
90
100
FLAVOR AMOUNT
B
142
144
0.5
144
142
146
-10
148
0.5
00
-.5
00
140

FIG. 8

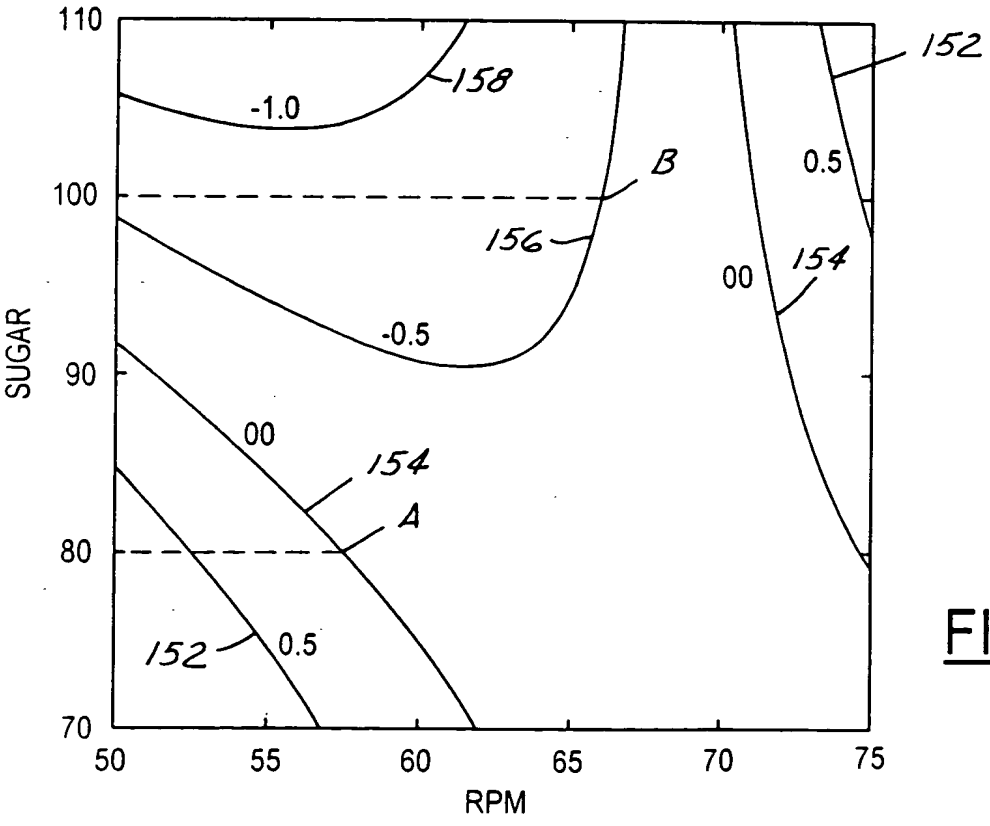
110
100
90
80
70
SUGAR
50
55
60
65
70
75
RPM
-1.0
158
B
152
0.5
150
156
00
154
-0.5
00
154
A
152
0.5

FIG. 9

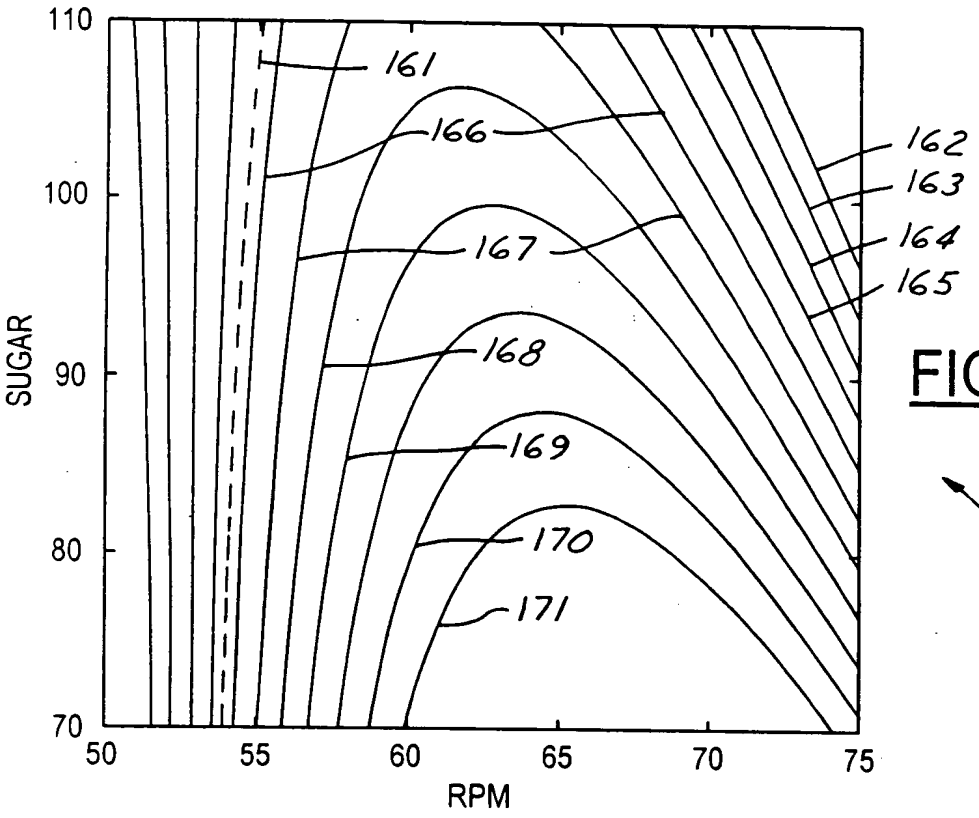
110
100
90
80
70
SUGAR
50
55
60
65
70
75
RPM
161
166
167
168
169
170
171
162
163
164
165
160

FIG. 10

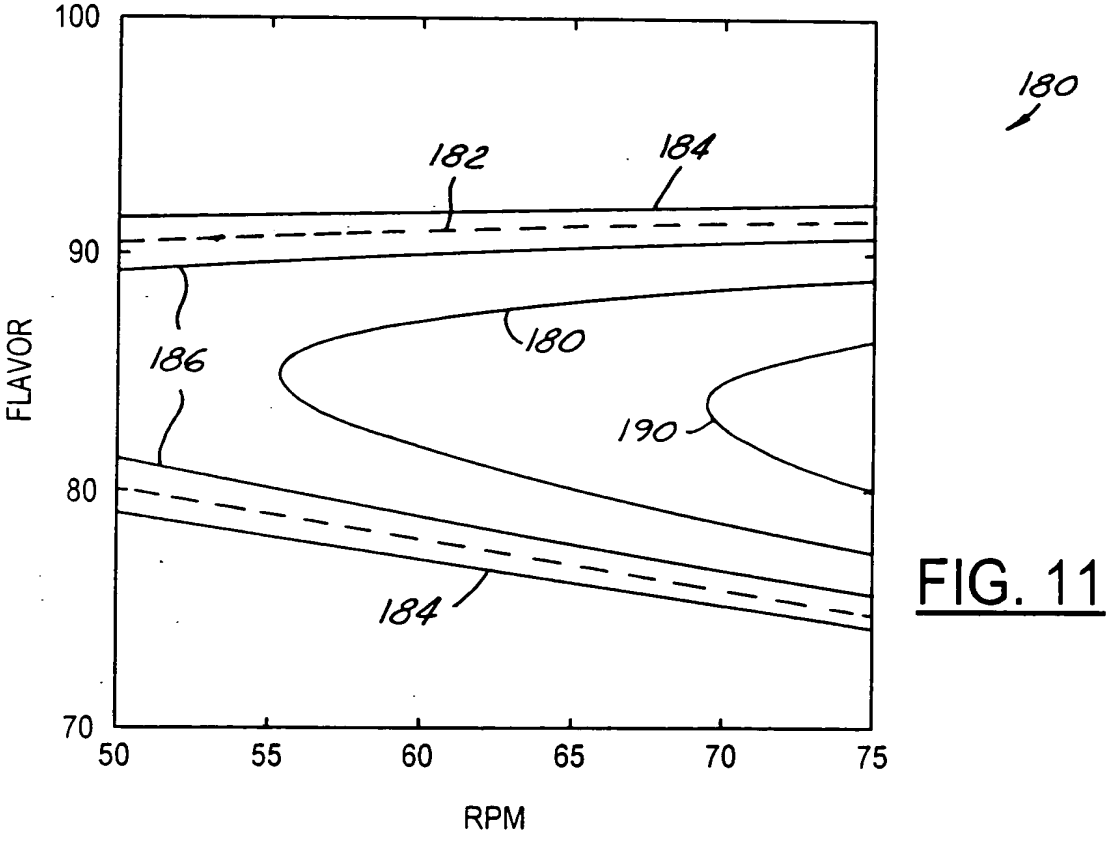
100
90
80
70
FLAVOR
50
55
60
65
70
75
RPM
182
184
186
180
190
184
180

FIG. 11

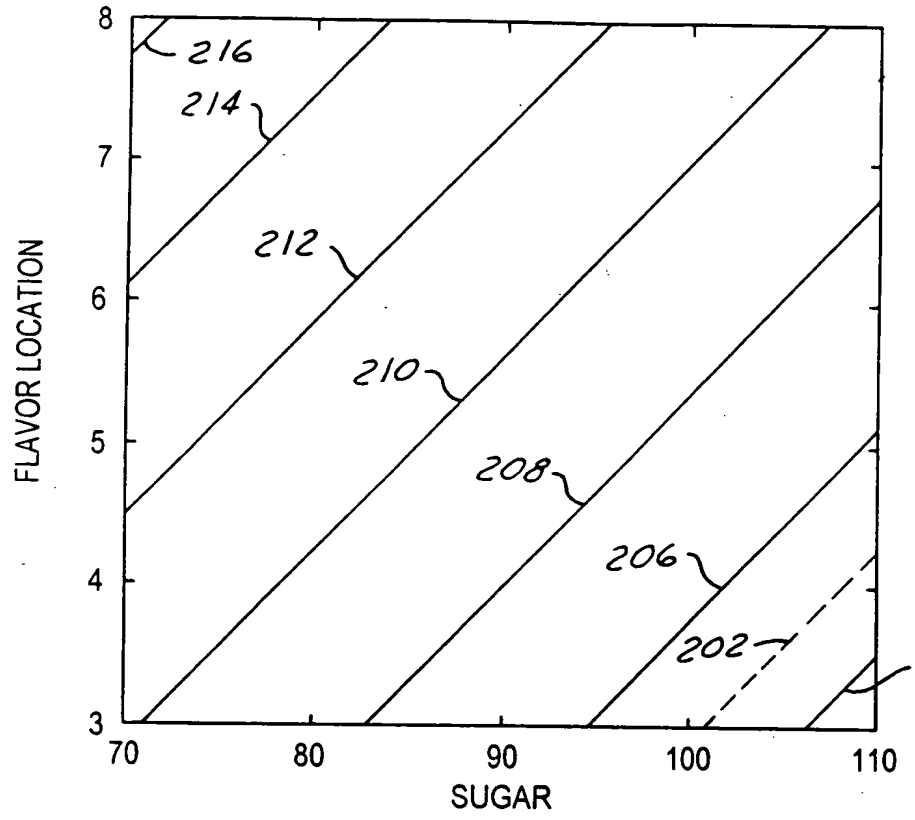
8
7
6
5
4
3
FLAVOR LOCATION
70
80
90
100
110
SUGAR
216
214
212
210
208
206
202
204
200

FIG. 12

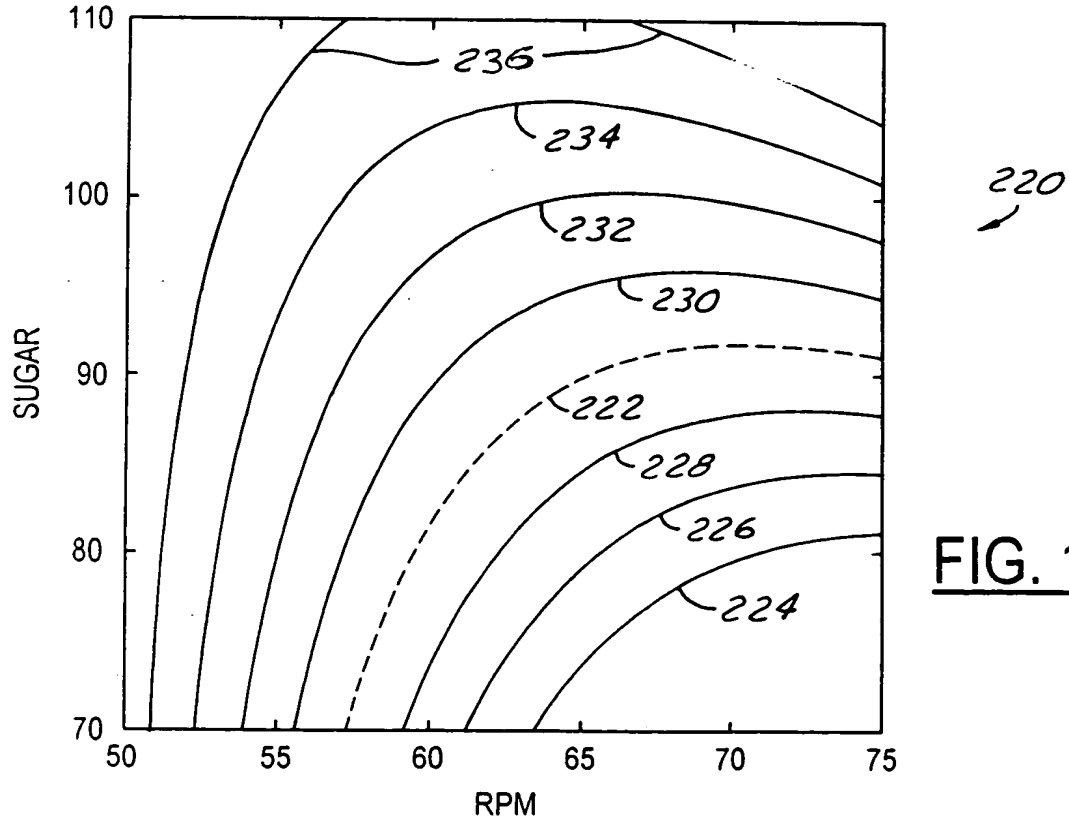
110
100
90
80
70
SUGAR
50
55
60
65
70
75
RPM
236
234
232
230
222
228
226
224
220

FIG. 13

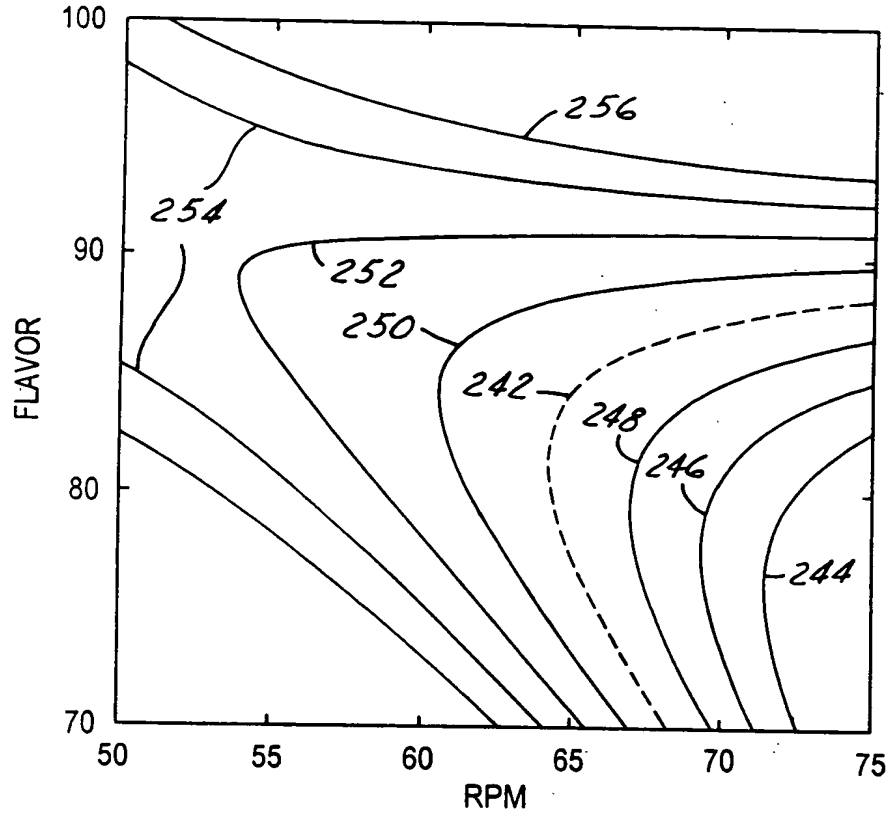
100
90
80
70
FLAVOR
50
55
60
65
70
75
RPM
256
254
252
250
242
248
246
244
240

FIG. 14

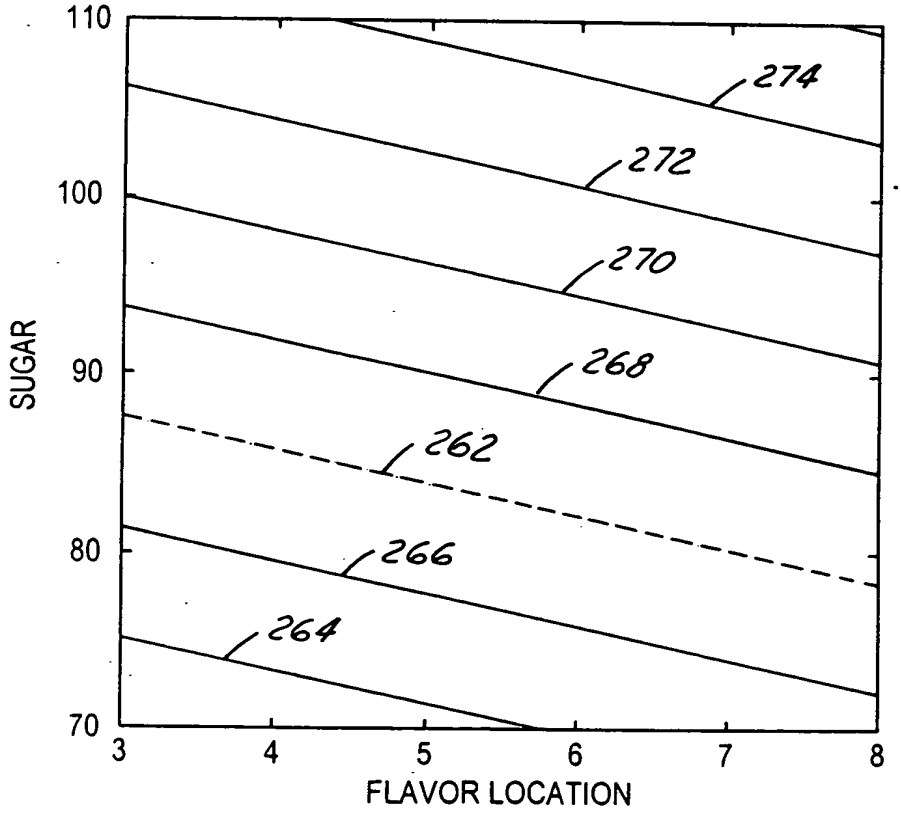
110
100
90
80
70
SUGAR
3
4
5
6
7
8
FLAVOR LOCATION
274
272
270
268
262
266
264
260

FIG. 15